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REPORT OF THE WORKING GROUP ON REFERENCE POINTS FOR FISHERIES MANAGEMENT 1/

Technical guidelines on biological reference points

I. INTRODUCTION

1. The United Nations Convention on the Law of the Sea (arts. 61 and 119) obliges States to take measures, based on the best scientific evidence available, to maintain or restore harvested stocks at a level which can produce maximum sustainable yield (MSY) as modified by relevant environmental and economic factors. In order to accomplish this goal, MSY should be adopted as a limit reference point rather than a target reference point as described below. However, for already depleted stocks the biomass which can produce MSY may serve as an initial rebuilding target.

2. Many fish stocks around the world are currently depleted. Improvements in fishing technology have allowed fleet fishing power to increase rapidly and to move quickly from one fishery to another. Maximum sustainable yield can often be exceeded in the early period of a fishery, resulting in resource depletion, associated ecological changes and serious economic problems. Although this is largely due to the lack of efficient controls, enforcement and compliance, the establishment of a set of biological reference points would contribute to better and more precautionary management.

3. Distinction should be made between limit reference points and target reference points. Limit reference points set boundaries which constrain utilization within safe biological limits and beyond which resource rebuilding programmes are required. Target reference points guide policy makers in resource utilization.

4. Reference points for a given stock are developed from biological models which need to take into account the best possible estimates of all sources of mortality, and should incorporate the special biological characteristics of each stock. Therefore, to develop reference points, stocks must be regarded as a biological unit throughout their range of distribution. Information on the state of the resource should cover the entire biological unit for comparison with reference points. This will require the identification of biological units for straddling fish stocks and highly migratory fish stocks.

5. As pollution from land- and sea-based sources affect the productivity and resilience of fishing resources, as well as fishery product safety and quality, management should include not only reference points and measures to control fishing, but also action to promote the reduction and, where feasible, the elimination of pollution and degradation of critical habitats.

6. The documents prepared by the Food and Agriculture Organization of the United Nations (FAO) for the Conference on the precautionary approach and reference points for fisheries management 2/ contain useful information and further guidance on these subjects and should be used in conjunction with the present document.

II. DEVELOPMENT OF MANAGEMENT OBJECTIVES

7. Prior to deciding upon a set of reference points, management objectives must be agreed upon. Reference points are not management objectives; they simply serve as a guide to aid managers in choosing from the range of options open to them.

8. The concept of optimal utilization in the United Nations Convention on the Law of the Sea includes the importance of economic and environmental factors as a basis for setting fisheries management objectives. However, optimal utilization does not have a simple technical definition and cannot be addressed with a single reference point. Therefore, a set of reference points is needed to take these factors into account, on the basis of the best scientific evidence available and with an explicit recognition of uncertainty.

9. Objectives must be set explicitly in order to be able to assess the success of the management procedures. The setting of objectives should, whenever possible, include the specification of the relative importance of different objectives in the overall policy. As objectives are often not explicitly stated, scientific advice must aim at providing an analysis of management options and their implications for the fishery.

10. There are a wide variety of complex objectives in the development of management policy for straddling fish stocks and highly migratory fish stocks. States may have many, sometimes completing, management objectives. However, a fundamental objective for all concerned must be the long-term conservation and utilization of fishery resources, and where feasible, other species of concern. That objective can be achieved, inter alia, through a precautionary approach to management of fisheries resources in their ecosystems.

III. TARGET AND LIMIT REFERENCE POINTS

11. A reference point is an estimated value derived from an agreed scientific procedure and an agreed model to which there corresponds a state of the resource and of the fishery and which can be used as a guide for fisheries management. Reference points should be stock-specific to account for the reproductive capacity and resilience of each stock and are usually expressed as fishing mortality rates or biomass levels.

12. Two types of reference points, limit reference points and target reference points, should be used. Limit reference points are designed for conservation and warn against the risk of over-exploitation. Target reference points are designed to indicate when an objective is being approached.

13. Agreement on the appropriate technically defined set of reference points is a prerequisite for a common approach to the management of straddling or highly migratory resources. By introducing limit reference points for triggering pre-agreed management responses, action may be facilitated when a problem occurs.

14. The fisheries management strategy should be developed in a multi-species context and describe the action that is taken as resource status changes. Management strategies need to be developed for each fishery, including newly developing fisheries, and should account for the biological characteristics of the resources by the use of appropriate reference points. These management strategies should take into account species belonging to the same ecosystem either dependent on, or associated with, target species.

15. Provisional limit and target reference points can usually be established, even when data are poor or lacking by analogy with other similar and better-known fisheries. In all cases, reference points should be updated as additional information becomes available.

16. For broad application of the precautionary approach to stock conservation it is important to agree on a minimum international guideline for management. With respect to the use of reference points, an appropriate minimum guideline is to apply MSY as a limit on fisheries. Fishing mortality should not be permitted to exceed the level that would produce MSY, and stock biomass should be maintained above the level needed to produce MSY. The choice of target reference points should be made such that there is low risk of exceeding the MSY limit reference point after accounting for all major sources of uncertainty. This guidance should be viewed as a minimum and not preclude more conservative management strategies.

IV. ACCOUNTING FOR UNCERTAINTY

17. To account for uncertainty, management strategies should be so designed that they will maintain or restore the stock at a level consistent with the selected reference points. Uncertainty always occurs in the advice with respect to the current position of the fishery in relation with the reference points. It is vital that uncertainty be quantified and used explicitly in the analysis.

18. The major sources of uncertainty are incomplete and/or inaccurate fishery data, natural variability in the environment and imperfect specification of models of the resources. Simulation studies which incorporate the expected variability and bias in input parameters and uncertainty concerning the factors controlling stocks should be used to scientifically evaluate management strategies. Results must be interpreted in a probabilistic way to reflect these uncertainties.

19. For a limit reference point, management actions should be taken if analysis indicates that the probability of exceeding the limit is higher than a pre-agreed level. If a stock falls below a limit reference point or is at risk of falling below it, action on the fishery is required to facilitate the rebuilding of the biomass whether or not the decrease is caused by the fishery or is related to environmental fluctuations.

20. The estimates of the reference points should be continuously revised as fisheries evolve and new information is obtained, particularly in the case of stocks subject to strong environmental fluctuations. Both biological and environmental studies will be necessary to facilitate this updating.

21. To be amenable to scientific evaluation, management plans should specify, inter alia, the data to be collected and used for management and their precision, the methods of stock assessment, as well as the decision rules for determining and initiating management measures.

V. LINKAGE TO MANAGEMENT

22. In order to estimate reference points, States should cooperate to promote the collection of data necessary for the assessment, conservation and sustainable use of the marine living resources and develop and share analytical and predictive tools. Precaution should be exerted at all levels of management in defining data requirements, developing stock assessment methods and elaborating management measures. The need for precaution requires the development of an effective capacity to take action rapidly for resource conservation and management. To facilitate this, the selection of reference points should be flexible to allow practical approaches to management.

23. To design effective management strategies, the management process needs to be clarified. It should include the specification of management objectives, development of limit and target reference points, agreement on management actions and assessment of management performance with respect to the accepted reference points. Management steps should ensure that target reference points are not exceeded on average and that the risk of exceeding limit reference points is low.

24. In some fisheries, the management approach used has had the undesirable effect of deteriorating the quality of the data collected. Management procedures should be designed specifically to reduce uncertainties in the data.

Notes

1/ This document is the report of the Working Group on Reference Points for Fisheries Management. The Group agreed that all concepts contained in this document reflect its consensus. However, there was insufficient time available to polish the drafting of paragraph 4 of this report.

2/ A/CONF.164/INF.8 and A/CONF.164/INF.9.